

South West of England Regional Development Agency

Wave Hub

Appendix I to the Environmental Statement

June 2006



Halcrow



South West of England
Regional Development Agency

**Subtidal Benthic Survey of the Wave
Hub: Interim Report.**

Report to Halcrow Group Limited

Precision Marine Survey Limited

15th June 2006

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Halcrow Group Limited

Subtidal Benthic Survey of the
Wave Hub: Interim Report

15th June 2006

Reference No: PM002/06/06-I

For and on behalf of Precision Marine Survey Limited	
Approved by:	_____
Signed:	_____
Position:	_____
Date:	_____

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1. INTRODUCTION

Precision Marine Survey Limited (PMSL) have been commissioned by Halcrow Group Ltd to evaluate the subtidal benthic communities within the revised Wave Hub deployment area and along the offshore section of the cable route. The original deployment area and cable route was surveyed by Fugro Survey Limited during October and November 2005.

Due to inclement weather and poor sea states throughout May 2006, offshore survey works were delayed until the end of the month, when PMSL were able to mobilise to the site in order to carry out the subtidal benthic survey and epifaunal assessment. The survey schedule is shown in Table 1.

Table 1. Survey Schedule

Date	Action	Wind & Sea State
29 th May 2006	Prepare for survey mobilisation	North Westerly force 4 – 5 Sea state – 2.5m swell
30 th May 2006)	Mobilisation to Newlyn	North Westerly force 5 – 6 Sea state – 2.5m swell
31 st May 2006	Travel to survey area and commence survey	North Westerly force 4, occasionally force 6 at first Sea state – 1.5m swell
1 st June 2006	Complete Survey and return to Newlyn	Westerly Force 3 – 4, becoming variable Sea state – 0.7m swell
1 st /2 nd June 2006	Return to Hull	N/A
2 nd June 2006	Demobilise	N/A

The vessel employed to carry out the survey was the MFV Valhalla, temporarily based in Newlyn during the summer, but its home port is Brixham. The vessel is a 20m stern trawler and both the master and crew are familiar with the area, although due to the hard nature of the seabed they rarely fish within the site or adjacent waters, preferring to fish south towards and beyond the Scilly Isles.

This report outlines the methods used during the survey and within PMSL's laboratory. The results set out in this report are based on a rapid assessment of the samples on board the survey vessels with the results verified under laboratory conditions. This approach allows the biotopes of the surveyed area to be classified and described in the context of those present in the wider area as identified by Fugro Survey Ltd. Fully quantitative analysis of all the samples will subsequently be undertaken and the methodology that will be adopted is

described in this report (it should be noted that at the time of writing, seven of the samples have been fully analysed).

2. METHODOLOGY

2.1. General Survey Requirements

Ten benthic stations were established within the survey area with two replicates taken at each station, producing a total of 20 subtidal benthic samples. Due to the coarse nature of the seabed sediments, a 0.1m² Hamon grab was employed to ensure sufficient material was collected at each sampling station.

Table 2. Subtidal Benthic Stations (WGS 84 Decimal Degrees)

Station	Latitude	Longitude	No of replicates	Depth (m)	Survey area
Bst 1	N 50 22 24.8	W 5 37 29.4	2	30	Deployment area
Bst 2	N50 22 18.3	W5 36 26.8	2	30.9	
Bst 3	N50 21 52.4	W5 37 13.0	2	31.2	
Bst 4	N50 20 53.8	W5 37 05.6	2	30.5	
Bst 5	N50 21 25.4	W5 36 29.1	2	27.8	
Bst 6	N50 22 51.8	W5 36 24.5	2	31.7	
Bst 7	N50 21 06.5	W5 35 49.6	2	29	
Bst 8	N50 20 16.5	W5 37 29.2	2	28.4	Cable Route
Bst 9	N50 19 40.1	W5 37 17.7	2	21.5	
Bst 10	N50 18 57.9	W5 37 08.0	2	19.8	

2.2. Subtidal Benthic Survey

At each pre-determined sampling station the 0.1m² Hamon grab was lowered to the seabed and the resulting sample recovered. To ensure adequate material was retained for analysis, sample volumes were checked prior to the grab sample being accepted with the sediment sample measured by volume. Any sample containing coarse shelly sands/gravel that did not attain a volume of 10 litres was rejected. Similarly, samples comprising hard substrata e.g. broken shell, rocks, cobble or gravel were rejected if a sample volume of 6 litres was not achieved. When samples were within these limits, each sample was photographed (digital image) and sub-sampled for subsequent Particle Size Analysis (PSA) and Loss On Ignition determination (LOI). Replicate samples (replicate B) were checked against the original (replicate A) sediment type and rejected if dissimilar. Approximately 50ml of sediment was

removed from the sample and stored in a pre-labelled sealable plastic bag in cool, dark conditions, the remainder of the sample was placed into a sample container prior to a rapid assessment of fauna present and subsequent sample processing.

Two replicate grab samples were taken for macrofaunal analysis at each station with a single PSA sample at each station as per the client's specification. A full survey log was maintained throughout the survey detailing time of sampling, position (DGPS), station and station number (replicate), water depth, physical characteristics of the sample, digital image number (cross referencing (QA)) and presence of any other relevant features. Sample processing was undertaken on a sequential basis utilising a nested sieving technique. Each acceptable sample was removed from the Hamon grab and placed into a hopper and sieved onboard through a 5mm and 1mm sieve in order to separate large sediment types and reduce damage to invertebrates. Following a rapid assessment of the sieved residues the samples were gently back-washed into sealable containers and borax buffered 4% formaline solution was added as a fixative. Each sample was labelled clearly on the lid and an additional waterproof label placed in the container, e.g. Halcrow/Wave Hub/May06/Bst3/A for Client-survey, date, station number and replicate.

2.3. Field Based Rapid Assessment

To enable biotopes to be assigned, a rapid assessment was carried out following sieving, and prior to the sample being fixed. A 10-minute period was set to remove as many faunal organisms as could be identified under a magnifying lens. The full sample was examined as a monolayer under water in the sample box, by eye under a fluorescent bench light and 1.5x illuminated magnifier. The fauna derived from this process was retained and stored in an appropriately labelled container, preserved and stored for verification, obvious taxa were provisionally identified and enumerated.

2.4. Laboratory Analysis

A single person undertook the sample sorting, conducting all the sieving, sorting work and sample description. A second member of staff carried out standard sorting quality control. Similarly, a single person carried out the identification of the sorted fauna. A second member of staff carried out standard identification quality control. A standard sample tracking procedure is followed throughout the analysis period.

All members of the taxonomic analysis and data manipulation staff have at least 10 years marine biological experience with wide range of experience in the field of benthic sample analysis and interpretation.

2.4.1. SORTING

Each sample was sieved in freshwater and then rinsed with running tap water through a nest of 20cm diameter 5mm and 1mm stainless steel sieves. The sieve contents were backwashed over a white tray to catch any potential spillage, into pre-labelled 10 litre plastic storage buckets. A borax buffered 4% formaline solution containing Rose Bengal vital stain was then added to the samples. The samples were well mixed and stored at a constant temperature of 10°C for at least 48 hours to ensure adequate staining and preservation, shaking once during the period.

After this, each sample was again washed through a through a nest of sieves, with the smallest mesh aperture of 1mm, to remove the preservative and partition the sample for ease of sorting. The residue from each sieve was then gently washed into white trays. Water was added to the tray and the contents agitated. Immediately after agitation, the light fraction was decanted to another tray. This procedure may be repeated up to 3 times, and each tray of light fractions examined as a sub-sample of the heavy fraction.

The trays are marked with the appropriate sample code (relating to the Client, date, specific site, sample and replicate no.). All fractions were then examined as a monolayer under water in white trays, both by eye under a fluorescent bench light and 1.5x illuminated magnifier. The fauna derived from this process is retained and stored by group in appropriately labelled containers, preserved and passed on for identification. Each tray would be check sorted by another member of staff.

2.4.2. TAXONOMIC IDENTIFICATION

The procedure for the identification of the sample material was as follows:

Identification is carried out using Olympus SZ40 zoom microscopes with 10X and 20X eyepieces, giving a maximum magnification of up to 80X. An additional 2X objective can occasionally be used to increase the potential magnification to 160X. Olympus BX41 compound microscopes are used for further magnification, up to 800X.

Identification of infaunal samples is to the lowest possible taxonomic level (i.e. species), during identification, all individuals are initially separated into families, with part animals being assigned to families where possible. The macrofaunal animals are identified to species level using standard taxonomic keys, low and high power stereoscopic microscopes and dissection, when necessary, for identification. Incomplete animals without anterior ends are not recorded as individuals to be included in the quantitative dataset. However, they were identified where possible and recorded as present. Similarly, motile and colonial sessile epibenthic taxa and meiofauna may only be recorded as present and not included within the infaunal quantitative data set.

Fish species not identified in the field will be identified back in the laboratory using Wheeler, (1969) and Whitehead *et al* (1989). Regular cross-reference identification would be carried out by the projects manager Mr Nigel Proctor as part of the standard QA procedure. Each sample residue will be described textually with the residue retained for possible further analysis and AQC. All fauna will be retained under the standard codes for 2 years or returned to the clients representative for further analysis and AQC should this be required.

The taxonomic literature used is essentially as given in Rees et al (1990) and reporting nomenclature will use Howson, C.M. & Picton, B.E., 1997.

2.4.3. BIOMASS

Biomass analysis will be performed by wet weight (tissue blotted) and carried out for individual species in each sample. Each taxa are placed on blotting paper for 30 seconds, to allow absorption of preservative into the blotting paper, following this time period the individuals are placed on the microbalance and the reading taken. The macrofaunal

organisms are then placed back in their respective pots and stored. Biomass calculations include all identifiable fragments and calculated to $\pm 0.0001\text{g}$, all biomass data will be recorded in grams or fractions thereof.

2.4.4. LABORATORY RAPID ASSESSMENT

Those faunal organisms removed during the on-board rapid assessment were checked for accuracy of identification, using the protocol described in section 2.4.2. These fauna were then checked against the fauna derived from the laboratory sorted sample, to ensure that they were representative of the station and formed the dominant taxa.

2.5. Particle size analysis (PSA) and Loss on Ignition (LOI)

The particle size analysis will be carried out by a combination of dry sieving and laser particle size analysis (for the fraction $<1\text{mm}$) using a Malvern Mastersizer 2000. Prior to analysis, the sediment samples will be split with one sub-sample being passed through a 1mm sieve to remove the larger size classes of sediment. The $<1\text{mm}$ fraction of the sample analysed using the Malvern Mastersizer 2000 and the $>1\text{mm}$ fraction put aside.

The second sub-sample will be oven dried (85°C) for 24 hours, weighed, then passed through a nest of sieves (8mm , 5.5mm , 4mm , 2mm , 1.4mm & 1mm). The residue in each sieve, including the $<1\text{mm}$ fraction will be then weighed. Data generated from these methods of analysis were merged and used to derive statistics such as mean grain size, bulk sediment classes (%silt, sand & gravel), skewness and sorting coefficient.

Total organic carbon will be determined by a 600°C loss on ignition methodology. To ensure that carbonate matter is removed before analysis the samples are treated with diluted hydrochloric acid. The samples are then agitated and further acid is added until effervescence has ceased. The sample is then cooled and oven dried at 105°C until the weight stabilises ($\pm 0.001\text{g}$). The weight of the sample is recorded and the sample is placed into a kiln at 600°C for four hours. Once the sample has cooled the sample is re-weighed and the difference between the two weights is expressed as a percentage of the total sediment.

3. RESULTS

3.1. Overview of sediment characteristics

Table 3 provides an overview of the sediments recorded at each sampling station based on a visual assessment undertaken during the survey and at the laboratory. .

Table 3. Visual description of Sediment Characteristics at Sampling Stations

Station	Sediment Characteristics
Bst 1	Coarse sand with shelly gravel & large shell
Bst 2	Coarse sand with shelly gravel & large shell
Bst 3	Coarse sand with shelly gravel & large shell
Bst 4	Cobbles, stones and gravel on coarse shelly gravel with large shell
Bst 5	Cobbles, stones and gravel on coarse shelly gravel with large shell
Bst 6	Coarse sand with shelly gravel & large shell
Bst 7	Cobbles, stones and gravel on coarse shelly gravel with large shell
Bst 8	Cobbles, stones and gravel on coarse shelly gravel with large shell
Bst 9	Cobbles, stones and gravel on coarse shelly gravel with large shell
Bst 10	Cobbles, stones and gravel on coarse shelly gravel with large shell

3.2. Biotopes

Using the above sediment characterisation, in conjunction with the fauna derived from the rapid assessment, and verified from the samples analysed thus far (7 number), two biotope complexes are identified, although one is considered a complex of two specific biotopes.

3.2.1. SS. SMX. OMX OVERLAIN BY SS.SCS.CCS.BLAN

This biotope is classified by offshore circalittoral mixed sediment overlain by *Branchiostoma lanceolatum* in circalittoral coarse sand with shell gravel. Benthic stations Bst1, Bst 2, Bst3 and Bst6 were assigned to this biotope based on sediment characteristics (visual description), depth, dominant taxa and other faunal species associated with the complex. These sites are located predominantly farthest offshore within the turbine area and to the north. The 4 stations placed within this biotope have undergone full laboratory analysis and

the assignation is considered to be certain. Table 4 provides further detail for each benthic station in relation to the dominant taxa identified.



Figure 1. Typical circalittoral coarse sand with shell gravel with large *Glycymeris glycymeris*

3.2.2. SS.SMX.OMX. OVERLAIN BY SS.SCS.CCS.POMB & SS.SCS.CCS.MEDLUMVEN

This biotope is classified by offshore circalittoral mixed sediment overlain by *Pomatoceros triqueter* with barnacles and bryozoan crusts on unstable circalittoral cobbles and pebbles. It should be noted that in the samples identified to date, the density and diversity of barnacle and bryozoan species is not as high as recorded during survey's within adjacent waters (Fugro 2005), and there appears to be a high incidence of exoskeleton with no live material, this is also the case with *Pomatoceros*. The number of other faunal taxa, especially polychaetes, would indicate that the area may be transitory between specific biotopes, especially where mixed sediments are in close proximity to hard compact substrata. There are similarities between the infauna recorded, especially polychaetes and amphipods, in both biotope complexes and as a consequence the biotope *Mediomastus fragilis*, *Lumbrineris* spp. and venerid bivalves in circalittoral coarse sand or gravel is considered to be representative. A particular species that features heavily in these samples is *Pisidia longicornis*, and although it is not assigned a specific biotope niche, it is nevertheless the dominant faunal species within the samples, and representative of the sediment type.

Benthic stations Bst 4, Bst 5 and Bst7, Bst 8, Bst 9 and Bst 10 are assigned to this biotope based on sediment characteristics (visual description), depth, dominant taxa and other

faunal species associated with the complex. These sites are located predominantly south and east within the deployment area (Bst 4, Bst 5 and Bst7) and solely along the cable route (Bst 8, Bst 9 and Bst 10). Stations 4, 5 and 7 have undergone full laboratory analysis and the assignment is considered to be certain, whereas samples collected from the newly aligned cable route have yet to be fully analysed, the data provided are from the rapid assessment. Table 4 provides further detail for each benthic station in relation to the dominant taxa identified.



Figure 2. Typical mixed cobble and pebble on coarse sand/shell gravel

3.3. Subtidal Benthic Communities

From the samples analysed so far, the subtidal faunal communities appear to be relatively diverse and moderately abundant, ranging from 49 to 75 species per 0.1m², and 155 to 251 individuals per 0.1m². The coarse shelly gravel sediments generally have a slightly lower mean species number (49 spp. – 64 spp.) and total abundance (155 to 247 individuals) in comparison to the more mixed sediment samples (64 spp. to 75 spp. and 161 to 251 individuals), although station 6 (shelly gravel) was comparable in terms of species diversity (64 spp.) and total abundance (247 individuals) to the mixed sediments.

Once the analysis of the samples has been completed, multivariate statistical analysis will better define any particular groups/stations with regard to similarities. However, at present table 4 provides an indication of the dominant taxa within each biotope and samples provisionally assigned to the specific biotope.

Table 4. Dominant taxa within samples

Subtidal Benthic Station	Biotope	Dominant Taxa
Bst 1	SS.SMX.Omx. Overlain by; SS.SCS.CCS.Blan	<i>Polygordius sp.</i> , <i>Ehlersia cornuta</i> , <i>Typosyllis spp.</i> , <i>Glycera lapidum</i> , <i>Echinocyamus pusillus</i> , <i>Pisione remota</i> , <i>Pseudomystides limbata</i> , <i>Sphaerosyllis bulbosa</i> & <i>Branchiostoma lanceolatum</i>
Bst 2	SS.SMX.Omx. Overlain by; SS.SCS.CCS.Blan	<i>Nemertea</i> , <i>Polygordius sp.</i> , <i>Ehlersia cornuta</i> , <i>Typosyllis spp.</i> , <i>Protodorvella kefersteini</i> , <i>Notomastus spp.</i> , <i>Pisione remota</i> , <i>Kefersteinia cirrata</i> , <i>Pseudomystides limbata</i> <i>Sphaerosyllis bulbosa</i> & <i>Branchiostoma lanceolatum</i>
Bst 3	SS.SMX.Omx. Overlain by; SS.SCS.CCS.Blan	<i>Polygordius sp.</i> , <i>Ehlersia cornuta</i> , <i>Typosyllis spp.</i> , <i>Glycera lapidum</i> , <i>Protodorvella kefersteini</i> , <i>Pisione remota</i> , <i>Kefersteinia cirrata</i> , <i>Marphysa bellii</i> , <i>Aonides paucibranchiata</i> & <i>Branchiostoma lanceolatum</i>
Bst 4	SS.SMX.Omx. Overlain by; SS.SCS.CCS.PomB & SS.SCS.CCS.MedLumVen	<i>Harmothoe impar.</i> , <i>Typosyllis spp.</i> , <i>Notomastus spp.</i> , <i>Juvenile Terebellidae</i> <i>and Sabellidae spp.</i> , <i>Leptocheirus tricristatus</i> , <i>Pisidia longicornis</i> & <i>Echinocyamus pusillus</i>
Bst 5	SS.SMX.Omx. Overlain by; SS.SCS.CCS.PomB & SS.SCS.CCS.MedLumVen	<i>Typosyllis spp.</i> , <i>Mediomastus fragilis</i> , <i>Notomastus spp.</i> , <i>Pomatoceros triqueter.</i> , <i>Eulalia aurea</i> , <i>Pisidia longicornis</i> & <i>Echinocyamus pusillus</i>
Bst 6	SS.SMX.Omx. Overlain by; SS.SCS.CCS.Blan	<i>Nemertea</i> , <i>Glycera lapidum</i> , <i>Polygordius sp.</i> , <i>Ehlersia cornuta</i> , <i>Typosyllis spp.</i> , <i>Protodorvella kefersteini</i> , <i>Juvenile Sabellidae spp.</i> , <i>Kefersteinia cirrata</i> , <i>Marphysa bellii</i> , <i>Leptocheirus tricristatus</i> & <i>Branchiostoma lanceolatum</i>

<p>Bst 7</p>	<p>SS.SMX.Omx. Overlain by; SS.SCS.CCS.PomB & SS.SCS.CCS.MedLumVen</p>	<p><i>Typosyllis spp.</i>, <i>Mediomastus fragilis</i>, <i>Notomastus spp.</i>, <i>Aonides paucibranchiata</i>, <i>Caulleriella alata</i>, <i>Pomatoceros triqueter</i>, <i>Pisidia longicornis</i> & <i>Ophiothrix fragilis</i></p>
<p>Bst 8 (full dataset incomplete, provisional assignment following rapid assessment)</p>	<p>SS.SMX.Omx. Overlain by; SS.SCS.CCS.PomB & SS.SCS.CCS.MedLumVen</p>	<p><i>Typosyllis spp.</i>, <i>Lumbrineris sp.</i>, <i>Mediomastus fragilis</i>, <i>Notomastus spp.</i>, <i>Pomatoceros triqueter</i>, <i>Psammechinus miliaris</i> & <i>Pisidia longicornis</i></p>
<p>Bst 9 (full dataset incomplete, provisional assignment following rapid assessment)</p>	<p>SS.SMX.Omx. Overlain by; SS.SCS.CCS.PomB & SS.SCS.CCS.MedLumVen</p>	<p><i>Typosyllis spp.</i>, <i>Lumbrineris sp.</i>, <i>Mediomastus fragilis</i>, <i>Notomastus spp.</i>, <i>Pomatoceros triqueter</i>, <i>Psammechinus miliaris</i> & <i>Pisidia longicornis</i></p>
<p>Bst 10 (full dataset incomplete, provisional assignment following rapid assessment)</p>	<p>SS.SMX.Omx. Overlain by; SS.SCS.CCS.PomB & SS.SCS.CCS.MedLumVen</p>	<p><i>Typosyllis spp.</i>, <i>Lumbrineris sp.</i>, <i>Mediomastus fragilis</i>, <i>Notomastus spp.</i>, <i>Pomatoceros triqueter</i>, <i>Psammechinus miliaris</i> & <i>Pisidia longicornis</i></p>

Stations 8, 9 and 10 may be subject to slight change in terms of the dominant taxa once the whole samples have been analysed, the dominant taxa highlighted following the rapid assessment are offered as an indication of fauna identified thus far.

4. DISCUSSION

To describe the nature of the benthic communities of the revised deployment area, a subtidal benthic survey was undertaken. However, due to prolonged poor weather, surveys were unable to be carried out until late May/early June 2006. Given the time constraints, and the period required for full analysis of the benthic samples, a rapid assessment was carried out to enable the determination of biotopes present within the revised deployment area and along the re-aligned section of the offshore cable route. The samples were analysed in full following verification of the rapid assessment, and these analyses are ongoing.

Two clear biotope complexes have been identified from the samples analysed thus far, and the provisional data from the rapid assessment. These biotopes indicate offshore circalittoral mixed sediments with relatively high diversity and moderate abundance. The shelly gravel biotope with *Branchiostoma lanceolatum* (SS.SMX.OMx. overlain by; SS.SCS.CCS.Blan) has been identified at 4 benthic stations sited predominantly in the northern and offshore sector of the deployment area, this agrees with the findings of the Fugro survey (Fugro, 2006) who also found this biotope in the northern offshore regional area. Those species identified as a result of the full analysis of the samples confirm that the assignment fits with the marine habitat classification (JNCC, 2004), and that the characterising species such as *Pisione remote*, *Polygorius spp.*, *Echinocyamus pusillus*, *Glycera lapidum* and *Branchiostoma lanceolatum* were present in moderate abundance.

The second biotope identified is slightly more complex in that it is an aggregation of more than one biotope, and is likely as a result of the close proximity of other soft sediment substrates and hard compact substratum on relatively moderate tidal streams along with a moderately exposed wave action. The characterisation of this biotope included offshore circalittoral mixed sediment overlain by *Pomatoceros triqueter* with barnacles and bryozoan crusts on unstable circalittoral cobbles and pebbles (SS.SMX.OMx. overlain by SS.SCS.CCS.PomB). Whilst *Pomatoceros triqueter* is a dominant faunal feature of these samples the density and diversity of barnacle and bryozoan species is not as high as recorded during the Fugro survey (Fugro 2006), and the substrata appear to be dominated by exoskeleton with no live material, this is also the case with *Pomatoceros*, although to a lesser degree.

As discussed previously, the relatively high diversity of other faunal taxa, especially polychaetes, would indicate that the area may be transitory between specific biotopes. There are similarities between the infauna recorded, especially polychaetes, to the biotope SS.SCS.CCS.MedLumVen, and as a consequence the biotope *Mediomastus fragilis*, *Lumbrineris spp.* and venerid bivalves in circalittoral coarse sand or gravel is provisionally considered to be representative. A particular species that features heavily in these samples is *Pisidia longicornis*, and although it is not assigned a specific biotope niche, it is nevertheless the dominant faunal species within the samples, and representative of the sediment type.

The remaining benthic stations were all classified within the SS.SMX.OMx. overlain by SS.SCS.CCS.PomB and SS.SCS.CCS.MedLumVen biotope complex, these stations covered the southern inner and mid areas of the revised deployment area and cable route. This compares with the data collected by Fugro who recorded the similar SS.SMX.OMx.

overlain by SS.SCS.CCS.PomB biotope complex within the cable route and southern area of the original deployment area.

Once the remaining samples have been fully analysed in terms of macrofauna and sedimentary analyses, statistical analysis will be carried to include the data collected by Fugro and confirmation of biotopes and community analysis will be provided.

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APPENDIX 1

Subtidal Benthic sample Matrix

MCS Code	Taxon	Station 1		Station 2		Station 3		Station 4		Station 5		Station 6		Station 7		Station 8		Station 9		Station 10	
		01FA	01FB	02FA	02FB	03FA	03FB	04FA	04FB	05FA	05FB	06FA	06FB	07FA	07FB	08FA	08FB	09FA	09FB	10FA	10FB
	PORIFERA																				
C133	<i>Scypha ciliata</i>			1				1		1											
C475	<i>Cliona sp.</i>													P							
	CNIDARIA																				
D390	<i>Halecium sp.</i>									P				P							
D424	<i>Hydrallmania falcata</i>													P							
D435	<i>Sertularia cupressina</i>							P						P							
D463	<i>Nemertesia antennina</i>							P		P				P							
D662	ACTINIARIA												2								
D759	<i>Edwardsiidae sp. Indet</i>												1								
	PLATYHELMINTHES																				

F2	<i>TURBELLARIA</i>											3								
	NEMERTEA																			
G1	<i>NEMERTEA</i>			5		3		2		3		12		2						
	NEMATODA																			
HD1	<i>NEMATODA</i>	1		1		2		1		2		3		1						
	CHAETOGNATHA																			
L9	<i>Sagitta sp. Indet</i>	2																		
	SIPUNCULA																			
N11	<i>Golfingiidae juv.</i>	1		1		2		1				3								
N14	<i>Golfingia elongata</i>					1				1										
	ANNELIDA																			
P15	<i>Pisione remota</i>	6		5		7						4								
P50	<i>Harmothoe sp. Indet</i>													1						
P50	<i>Harmothoe juv.</i>	1		2		1						4								
P50.1	<i>Malmgrenia juv.</i>			3		1		1												

P65	<i>Harmothoe impar</i>						6						2						
P55	<i>Malmgrenia castanea</i>				2														
P70	<i>Malmgrenia mcintoshii</i>				1						2								
P118	<i>Eteone longa</i>	2		4									1						
P121	<i>Hesionura elongata</i>	1									2		1						
P136	<i>Pseudomystides limbata</i>	5		5	2		1		2		3								
P150	<i>Eulalia</i> Sp. Indet (incomplete)				1														
P151	<i>Eulalia aurea</i>								5				1						
P155	<i>Eulalia mustela</i>								1										
P164	<i>Eumida bahusiensis</i>			1															
P171	<i>Nereiphylla rubiginosa</i>								1										
P175	<i>Paranaitis</i> sp. Indet (incomplete)										3								
P255	<i>Glycera</i> sp. juv.	2		3	3				1		1								
P260	<i>Glycera lapidum</i> agg.	6		3	12		1		3		5		1						

P268	<i>Glycinde nordmanni</i>			1		4						3								
P305	<i>Kefersteinia cirrata</i>	3		10		10				2		10								
P349	<i>Ehlersia cornuta</i>	17		7		5			4		1		9							
P355	<i>Eurysyllis tuberculata</i>			2									1							
P362	<i>Trypanosyllis coeliaca</i>	3		1		2			1				4							
P364	<i>Typosyllis sp.</i>	12		17		11			13		9		14							
P366	<i>Typosyllis brevipennis</i>					1														
P375	<i>Amblyosyllis formosa</i>												1							
P377	<i>Dioplosyllis cirrosa</i>										1		1							
P385	<i>Odontosyllis sp. A</i>	2																		
P388	<i>Odontosyllis gibba</i>			3					4		1									
P406.1	<i>Syllides articulocirrata</i>	1																		
P423	<i>Exogone verrugera</i>			1																
P425	<i>Sphaerosyllis bulbosa</i>	6		13							1		1							
P427	<i>Sphaerosyllis hystrix</i>	1		5							1		1							

P434	<i>Autolytus sp.</i>	1		2																
P475	<i>Nereis longissima</i>	3		2			1			1										
P478	<i>Nereis zonata</i>						2		3											
P493	<i>Aglaophamus rubella</i>					1														
P494	<i>Nephtys juv.</i>						1													
P564	<i>Marphysa bellii</i>			4		5	2		1		14		1							
P579	<i>Lumbrineris gracilis</i>	2		1		3	3		1		1		1							
P588	<i>Arabella iricolor</i>			1			2													
P606	<i>Dorvillea sp.</i>			5		2														
P638	<i>Protodorvillea kefersteini</i>	5		5		7	2		1		11									
P642	<i>Schistomeringos neglecta</i>			1					1		1		1							
P675	<i>Aricidea sp. Indet (incomplete)</i>						1													
P699	<i>Paradoneis c.f. lyra</i>												1							
P718	<i>Poecilochaetus serpens</i>								1				1							
P722	<i>Aonides oxycephala</i>										2									

P723	<i>Aonides paucibranchiata</i>	2			5		3		4		4		4						
P733	<i>Laonice bahusiensis</i>			5			2		1				1						
P747	<i>Minuspio cirrifera</i>						1		1										
P748	<i>Polydora juvenile</i>												1						
P750	<i>Polydora caeca</i>								1										
P823	<i>Aphelochaeta sp.</i>			2															
P829	<i>Cautleriella alata</i>			1		1		2		2				5					
P878	<i>Diplocirrus glaucus</i>									1									
P889	<i>Macrochaeta sp. Indet</i>											2		1					
P919	<i>Mediomastus fragilis</i>							3		5				4					
P920	<i>Notomastus sp.</i>			5		4		12		7		2		3					
P999	<i>Ophelia borealis</i>					1													
P1026	<i>Scalibregma celticum</i>							3		1									
P1062	<i>Polygordius sp. (incomplete)</i>	26		52		17						13							
P1065	<i>Polygordius lacteus</i>	1																	

P1175	<i>Terebellides stroemi</i>							2												
P1177	<i>Trichobranthus glacialis</i>												1							
P1179	<i>Terebellidae juv.</i>	4						6	3		3		1							
P1189	<i>Eupolymnia nebulosa</i>							2	1		1		2							
P1195	<i>Lanice conchilega</i>	1		1		1		2	2		1		1							
P1235	<i>Polycirrus sp.</i>							2												
P1257	<i>Sabellidae (incomplete)</i>			4				8	1		10									
P1290	<i>Jasmineira elegans</i>					1		1	2		2		2							
P1316	<i>Pseudopotamilla reniformis</i>								1											
P1324	<i>Serpulidae (incomplete)</i>	1		2				2												
P1334	<i>Hydroides norvegica</i>	1																		
P1341	<i>Pomatoceros triqueter</i>							2	7		2		19							
P1343	<i>Serpula vermicularis</i>												1							
P1524	<i>Grania sp.</i>										1									
	CHELICERATA																			

Q5	<i>Nymphon brevirostre</i>						1													
Q7	<i>Nymphon gracile</i>			1																
	CRUSTACEA																			
R77	<i>Balanus crenatus</i>												1							
R148	CALANOIDA	7		2		3	1		2			11	1							
S25	MYSIDACEA											1	1							
S97	<i>Amphipoda</i> sp. Indet (incomplete)	1							1											
S102	<i>Apherusa bispinosa</i>			1			1					3								
S109	<i>Eusirus longipes</i>					1														
S118	<i>Oedicerotidae</i> sp. Indet (incomplete)			2																
S125	<i>Monoculodes carinatus</i>			1																
S133	<i>Pontocrates altamarinus</i>					1														
S164	<i>Gitana sarsi</i>						2													
S213	<i>Stenothoe marina</i>						1		3											
S265	<i>Parametaphoxus fultoni</i>			5			3													

S303	<i>Liysianassa ceratina</i>							1												
S342	<i>Tryphosella sp. Indet (incomplete)</i>										1									
S343	<i>Tryphosella nanoides</i>												1							
S344	<i>Tryphosella sarsi</i>							2												
S384	<i>Iphimedia spatula</i>								1											
S397	<i>Liljeborgia pallida</i>	3						1					1							
S429	<i>Ampelisca diadema</i>					1														
S495	<i>Melitidae sp. Indet (incomplete)</i>			1																
S502	<i>Ceradocus semiserratus</i>	4		3				5				1		1						
S506	<i>Cheirocratus sundevallii</i>					1														
S514	<i>Gammarella fucicola</i>													2						
S519	<i>Maera othonis</i>			4				2												
S538	<i>Gammaropsis sp. Indet</i>													1						
S539	<i>Gammaropsis cornuta</i>							2												
S588	<i>Leptocheirus hirsutimanus</i>									2										

S591	<i>Leptocheirus tricristatus</i>	1			2		6				39								
S615	<i>Corophium sextonae</i>						1						3						
S659	<i>Pseudoprotella phasma</i>								1				1						
S793	<i>Gnathia praniza</i>	1									1								
S794	<i>Gnathia dentata</i>	1			1						4								
S803	<i>Anthura gracilis</i>												1						
S849	<i>Conilera cylindracea</i>										1								
S892	<i>Janira maculosa</i>	1		1	2		1		3				1						
S1169	<i>Tanaissus lilljeborgi</i>				1														
S1276	<i>Decapoda zoea</i>	4		1	1		2				2		2						
S1360	<i>Thorulus cranchii</i>												1						
S1445	<i>Paguridae juv.</i>						3		3				1						
S1447	<i>Anapagurus chiroacanthus</i>								1										
S1448	<i>Anapagurus hyndmanni</i>						1		2				1						
S1470	<i>Juvenile Galathea sp. Indet</i>						2				1		2						

S1472	<i>Galathea intermedia</i>						1													
S1476	<i>Galathea strigosa</i>						1													
S1482	<i>Pisidia longicornis juv</i>	1		2		1	4													
S1482	<i>Pisidia longicornis</i>						71		34		1		68							
S1508	<i>Ebalia tuberosa</i>								1				1							
S1509	<i>Ebalia tumefacta</i>	1				1	1													
S1577	<i>Liocarcinus sp. juv.</i>								1											
S1620	<i>Xantho pilipes</i>						1		2											
	INSECTA																			
	<i>Isotomidae sp. Indet</i>										1									
	MOLLUSCA																			
W46	<i>POLYPLACOPHORA juv.</i>																			
W53	<i>Leptochiton asellus</i>						4		1				1							
W86	<i>Acanthochitona crinita</i>						1													
W106	<i>Emarginula fissura</i>						2		1				1							

W107	<i>Emarginula rosea</i>																				
W116	<i>Diodora graeca</i>																				
W161	<i>Gibbula tumida</i>						3				1										
W163	<i>Gibbula cineraria</i>								1												
W669	<i>Vitreolina philippi</i>	1																			
W675	<i>Trophon barvicensis</i>						2														
W747	<i>Hinia incrassata</i>												1								
W1243	NUDIBRANCHIA (incomplete)								1												
W1270	<i>Doto sp.</i>												1								
W1319	<i>Onchidorididae</i>												1								
W1569	<i>Nucula nitidosa</i>								1												
W1688	<i>Glycymeris glycymeris</i>	1				1			1		1		1								
W1698	<i>Modiolus sp. juv.</i>	1																			
W1708	<i>Modiolula phaseolina</i>						1														
W1736	<i>Limidae juv.</i>										2										

W1741	<i>Limaria (Limaria) hians</i>							2						1							
W1743	<i>Limaria loscombi</i>											1									
W1746	<i>Limaria subauriculata</i>							1													
W1771	<i>Pecten maximus</i>													1							
W1773	<i>Aequipecten opercularis</i>													1							
W1786	<i>Palliolium tigrinum</i>					2															
W1805	<i>Anomiidae juv.</i>							1				1			3						
W1809	<i>Heteranomia squamula</i>													1							
W1875	<i>Kellia suborbicularis</i>									2											
W1959	<i>Laevicaeridium crassum</i>							1			1		1								
W2015	<i>Arcopagia crassa</i>							1													
W2023	<i>Moerella pygmaea</i>	1																			
W2091	<i>Circomphalus casina</i>												2								
W2100	<i>Clausinella fasciata</i>	3																			
W2104	<i>Timoclea ovata</i>												1								

W2113	<i>Tapes rhomboides</i>			1																
W2130	<i>Dosinia exoleta</i>										1									
W2233	<i>Thracia villosiuscula</i>							1												
	BRYOZOA																			
Y504	<i>Turbicellepora avicularis</i>							P												
	ECHINODERMATA																			
ZB105	<i>OPHIUROIDEA juv.</i>	4		4		4		1		2		4								
ZB124	<i>Ophiothrix fragilis</i>													7						
ZB149	<i>Amphiura</i> sp. Indet (incomplete)							1												
ZB193	<i>Psammechinus miliaris</i>									3				2						
ZB212	<i>Echinocyamus pusillus</i>	11		4		1		6		1		1		1						
ZB219	<i>Spatangus purpureus</i>					1														
	TUNICATA																			
ZD71	<i>Ciona intestinalis</i>									3		1								
ZD120	<i>Dendrodoa grossularia</i>							4						3						

	PISCES																				
ZE0.1	<i>Branchiostoma lanceolatum</i>	3		5		10						3									
ZG87	<i>Lepadogaster juv.</i>			1																	
ZG88	<i>Lepadogaster candollei</i>			1																	
ZG89	<i>Lepadogaster lepadogaster</i>	1																			
	Total abundance	170	0	229	0	156	0	251	0	161	0	247	0	184	0	0	0	0	0	0	0
	Total No. Taxa	49	0	57	0	52	0	75	0	67	0	64	0	64	0	0	0	0	0	0	0